SENSOR TECHNOLOGIES

Devices that provide a signal that accurately reflects some process parameter in real time.

Status:

Sensors with greatly improved selectivity, stability, sensitivity, precision, environmental resistance and range are under development at university, government and industrial laboratories. A major driving force for this development is "continuous process" applications in areas such as foods, beverages, materials, pharmaceuticals, chemicals, biochemicals, smelting, refining and waste management. Optical, electrical, acoustical and bio-sensors appear to be developing rapidly. Sensors for the non-visible regions of the electromagnetic spectrum are receiving less emphasis.

Likely Scenario:

The U. S. Department of Commerce projects a world sensor market of $12B by the year 2000*. In that case we can expect that a multitude of new sensor technologies will become available during this plan period. New sensor technologies will be most readily applicable to liquid, rather than solid streams. Many of them will have short comings in real process situations (variable feedstocks, sensor lifetime, operational complexity, control system compatibility.) However useful new technologies will emerge. Considerations such as efficiency, quality, and inspection of new (novel) products will make these applications important to PM operations. In addition, biosensor development may lead to selective measurements of smoke components in room air and/or to more efficient analytical methods.

Alternate Scenario:

Reduced industry and government support for basic research may slow domestic development of these technologies.

Advances in the understanding of relationships between specific biological activity and chemical compounds could lead to the development of detectors for biological activity.

R&D Response:

We must continue to monitor a wide range of sensor development and to implement valuable technologies early as possible. While some of the new technologies will be directly

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applicable in their off-the-shelf form, many will need to be modified or developed for our uses. We must maintain enough internal activity in these areas to allow development and implementation with minimal learning time. This may be especially true in the case of the more specialized techniques such as biosensors or those using non-visible radiation.

A focused approach to the above activities is recommended. To the extent possible, future applications should be anticipated. Increased emphasis should be placed on establishing pathways and procedures for the smooth implementation of new or existing sensor technologies.

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